

Rigidized Deployable Lifting Brake for Atmospheric Entry, Phase I

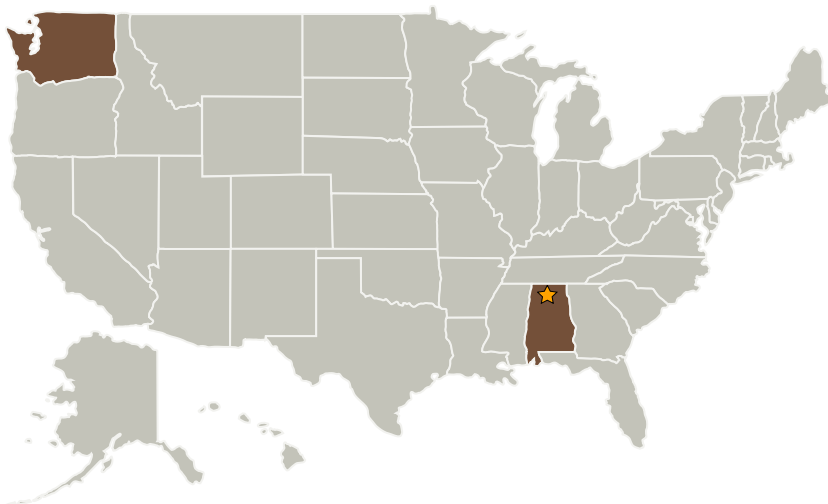
Completed Technology Project (2007 - 2007)



Project Introduction

Aerobraking to reduce velocity for planetary capture and landing has long been assumed for use on Mars missions because Mars has an atmosphere, and the use of aerobraking minimizes the amount of propellants required from the Earth's surface. For Mars exploration missions, where large quantities of equipment will be required, an aerobrake that is adequate for the size and amount of equipment will need to be quite large. Unfortunately, carrying a large aerobrake to orbit requires either an unreasonably large shroud or an expensive on-orbit assembly process. Flexible aerobrakes have promise, but pressure-supported ribs with tension-supported areal TPS have potential flagging instabilities. Andrews Space, Inc. proposes an innovative aerobrake design that is deployable and rigidizable, meeting initial launch volume constraints and satisfying terminal aerobraking requirements. The design will include rigidizing foams as a key feature, adding a few percent to weight but greatly enhancing the capability to aerobrake oversized exploration elements. Andrews proposes to initially explore in Phase I a range of design options, using its integrated conceptual design tools and systems engineering processes to establish a preferred approach. That approach can be further developed and tested in Phases II and III to mature the associated technologies and design.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission
Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center
(MSFC)

Responsible Program:

Small Business Innovation
Research/Small Business Tech
Transfer

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Organizations Performing Work	Role	Type	Location
★ Marshall Space Flight Center (MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
Andrews Space, Inc.	Supporting Organization	Industry	Tukwila, Washington

Primary U.S. Work Locations

Alabama	Washington
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX07 Exploration Destination Systems
 - └ TX07.1 In-Situ Resource Utilization
 - └ TX07.1.2 Resource Acquisition, Isolation, and Preparation